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A Feasibility Study Comparing a Web-Based Intervention to a Workshop Intervention for Caregivers of Adults with Eating Disorders

Abstract

Objective: To assess for the validity of a future trial, the current feasibility study aimed to compare the feasibility and efficacy of a web and workshop-based education intervention for caregivers of adults with eating disorders. **Methods**: Psychoeducation was provided to caregivers, who were randomly assigned to a web or workshop condition. Independent samples t-tests were conducted to analyze the between-group effect sizes for intervention condition with regard to change over time. A random selection of participants from each intervention provided qualitative feedback about their experiences. **Results**: Overall, participants reported positive experiences in both education interventions. From baseline to the end of intervention, small between-group effect sizes were observed for changes in caregiver accommodation, problem-solving abilities, the quality of psychological health, and the quality of social relationships, favouring the web-based intervention; and changes in expressed emotion in the family context, caregiver burden, perceived stress, and the quality of the environment, supporting the workshop intervention. **Conclusions:** There was a difference in initial feasibility of the web-intervention. A future large-scale trial of these interventions is supported by the results of this feasibility study.

Highlights

- Web and workshop education interventions were assessed and both were found to be acceptable and feasible
- The web-intervention was less tolerable at time of randomization as indicated by higher rates of drop-out immediately after randomization.
- A random sub-set of study participants provided qualitative feedback, and participants from both interventions desired longer time to process study materials.

Keywords: Caregiver, Education, Eating Disorders, Feasibility

Introduction

Eating disorders (ED) such as Anorexia (AN) or Bulimia Nervosa (BN) are severe mental health disorders (Smink, van Hoeken & Hoek, 2012) accompanied by a myriad of medical complications (Swanson, Crow, Le Grange, Swendsen & Merikangas, 2011). Despite their severity and complexity, persons with an ED often have limited support systems outside of their nuclear family (Coomber & King, 2012; Dimitropoulos, Herschman, Toulany & Steinegger, 2016). This may lead to an over-reliance on caregivers for emotional and instrumental support (Agh et al., 2016). In turn, caregivers can experience an elevated degree of perceived burden regardless of their loved-one's age, illness duration, or severity (Matthews, Lenz, Peugh, Copps & Peterson, 2018).

A recent review of caregiving in eating disorders (Anastasiadou, Medina-Pradas, Sepulveda & Treasure, 2014) emphasized that caregivers are a positive and important part of effective treatment. However, there are three factors that may impact the efficacy of caregiving: 1) carer factors (e.g., knowledge of illness, expressed emotion), 2) illness factors (e.g., ego-syntonic nature of the illness, ambivalence towards changing symptoms) and 3) environmental factors (e.g., stigma, lack of treatment availability) (Anastasiadou et al., 2014). Family members who take on a caregiving role may experience a lower quality of life compared to non-caregivers (Highet, Thompson & King, 2005) due to social isolation, feelings of burden, distress, and low caregiver efficacy (Coomber & King, 2012). In turn, these aspects of caregiving may render caregivers vulnerable to mental health concerns including clinical levels of anxiety and depression (Kyriacou, Treasure & Schmidt, 2008; Sepulveda et al, 2012).

The relationship between the wellbeing of the individual with an ED and their caregivers is complex (Treasure & Nazar, 2016); when caregivers experience difficulty coping with their loved one's illness, they may develop ineffective caregiving strategies such as accommodating and enabling responses to illness behaviours (Graap et al., 2008; Treasure et al., 2008) which in turn may elicit more ED behaviours. This is known as the interpersonal maintenance model of eating disorders (Goddard et al., 2011) which describes a vicious cycle of harmful behaviours (Treasure & Schmidt, 2013) that has deleterious effects on the individual with an ED and family functioning (Dimitropoulos, Carter, Schachter & Woodside, 2008).

For individuals with an ED whose caregivers receive psychoeducation about the illness, they can experience greater improvements during treatment, reduced rates of relapse, and less ED psychopathology than those of caregivers not receiving this type of support (Goddard, et al 2013). For caregivers, psychoeducation and support interventions contribute to decreased distress, burden, and a reduction in behaviours that accommodate to the illness (Hibbs, Rhind, Lepanen & Treasure, 2015; Sepulveda et al., 2012), decreased expressions of criticism and emotional over-involvement (Goddard et al., 2011) and an enhanced quality of life (Goddard et al., 2013). Furthermore, caregivers qualitatively describe the interventions as essential for the management of the illness in their loved one and increased personal self-care (Zuckler, Marcus, Bulik, 2006).

Treasure and Nazar (2016) have indicated that the essential features of successful caregiver psychoeducation includes the following: education about the stages of change, information on interpersonal maintenance factors of eating disorders, and skills for communication and behavioural intervention. Further, interventions are typically delivered in

four distinct formats: 1) Workshop-based (Pepin & King, 2013; Sepulveda et al., 2008a; 2008b; Spettigue et al., 2015; Whitney et al., 2012), 2) Web-based (Binford Hopf, Le Grange, Moessner & Bauer, 2013; Hibbs et al., 2015; Hoyle, Slater, Williams, Schmidt & Wade, 2013), 3) through Self-Help Workbooks (Goddard et al., 2011; Grover et al., 2011; Hibbs et al., 2015b; Rhind et al., 2014) or 4) through DVD (Quadflieg, Schadler, Naab & Fichter, 2017; Sepulveda, 2008c). Each mode of intervention has positive impacts on caregivers (Hibbs et al., 2014) across measures of expressed emotion (Family Questionnaire, Level of Expressed Emotion scale), perception of burden (Eating Disorder Symptom Impact Scale), anxiety and depression (Hospital Anxiety and Depression Scale; Depression Anxiety and Stress Scale) and accommodation to the illness (Accommodation and Enabling Scale of Eating Disorders). A majority of studies have been conducted with adults (Hoyle et al., 2013; Sepulveda 2008abc) or with a mixed population of adolescents and adults (Goddard et al., 2011; Grover et al. 2013; Magill et al., 2015; Pepin et al., 2013; Sepulveda et al., 2008) while a minority focus exclusively on caregivers to adolescents (Binford et al., 2013; Rhodes et al., 2008; Spettigue et al., 2015).

Although the benefits of caregiver interventions, such as decreased distress, burden, and expressed emotion, are well documented (Hibbs et al., 2018), there are currently no studies that compare the efficacy of different modes of caregiver interventions on carer outcomes. Some studies have investigated the difference between the impact of clinically guided vs. unguided self-help interventions via the web (Hoyle et al., 2013) or through workbooks (Goddard et al., 2013), but to date none have compared a web-based caregiver intervention to a workshop caregiver intervention. Evidence-based clinical practice strives to provide treatments that are both most effective and accessible without undue financial or time

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strain on systems or service users with eating disorders. Given the severity of impacts experienced by caregivers to those with an ED (Anastasiadou et al.,2014; Fox, Dean & Whittlesea, 2017; Stillar et al., 2016) and the interpersonal maintenance model that shows ineffective caregiving may exacerbate ED symptoms (Goddard et al., 2011), it is vitally important that effective interventions aimed to help them are made as broadly accessible in a variety of contexts.

Purpose Statement

The primary objective of this study was to assess the feasibility of a psychoeducational intervention for caregivers of adults with eating disorders. The secondary objective of this study was to estimate the treatment effect sizes and standard deviations for the outcome measures to inform sample size calculations for a future trial.

Method

Study Design

A study of caregiver psychoeducation interventions was conducted, following ethics approval, from January 2015 to January 2017. The study recruited participants using stratified sampling across the following strata: caregivers to those with AN-BP, caregivers to those with AN-R, and caregivers to those with BN. These strata were selected to help control for equal distribution of eating disorder diagnoses across the web and workshop interventions. A principle investigator of the study created numerically sequential sealed envelopes for each diagnosis category and individuals were randomized by opening the next envelope in order for their family member's illness type. This ensured an equal distribution of diagnoses between

interventions. If multiple participants were from the same family, they were randomized as a unit.

After each intervention, a random selection (30%) of participants from both web (n = 6) and workshop (n = 6) arms of the study were asked to participate in a qualitative interview (QI) with the research coordinator. The purpose of this interview was to obtain qualitative feedback on the content and process of the web based and workshop interventions. The feasibility of the interventions were ascertained both by participant attrition and feedback from the QIs. Furthermore, QIs allowed the research team to better understand the similar or unique perceived challenges and benefits of the interventions and aim to provide information for the development of a future large scale trial of the interventions. Interviews were conducted one-on-one in person or over the phone at the participant's convenience. Interviews used a standardized set of questions (i.e., "what was your experience of the intervention?", "If you could change the intervention, what would you change?", "what were the best aspects of the intervention?") and lasted a minimum of 30 and maximum of 45 minutes.

Recruitment, Data Collection and Participant Characteristics

Study posters were created and distributed across specialized and community-based organizations for eating disorders treatments, moderated forums for the support of caregivers and a national eating disorder information centre. All potential participants contacted the research coordinator who obtained verbal and written informed consent. Once participants consented to the study, they were asked to complete questionnaires at baseline. Information about their loved-one's diagnosis was collected from these questionnaires and participants were then randomized to either the web or workshop intervention. Participants were also

asked to complete questionnaires at the end of intervention and three months post-intervention.

Intervention

The current feasibility study adapted a web-intervention for use in both arms of the study. The original web-intervention was developed by ED experts, caregivers to those with AN, and those with AN in the United Kingdom (Schmidt, Williams, Eisler, Fairburn, McCloskey et al., 2007.) Full details about the development and content of the intervention can be read in a published pilot (Grover et al., 2010) and a Randomized Control Trial of the intervention (Grover et al., 2011). The web-based intervention was adapted by the study authors into a 2-day workshop format that covered the same material, in the same order as the web-based intervention. Adaptations consisted of the study team reviewing and duplicating audio guided PowerPoint presentations into workbooks with accompanying facilitator guides. The psychoeducation in both web and workshop conditions consisted of 8-modules covering the following topics: eating disorder psychoeducation, effective communication and stages of change, the effect on families, meal support, risk assessment, binging and purging, relapse prevention, and caregiver's own needs. Some examples of strategies taught to caregivers were: *(1) Five-areas of assessment model of behaviour* which included a cognitive behaviour therapy tool used for caregivers to begin understanding how their cognitions, behaviours and emotions are linked and create cycles of interaction within the family*; (2) Anxiety Control Training* which included brief training in the use of mindfulness recordings to promote self-soothing*; (3) Practical strategies for meal support* which included small group exercises for developing strategies and practice of conversations.

Web Intervention Protocol

Participants in the web intervention were given access to eight weeks of online material that they could complete at their own pace. The participants had eight modules to complete that included: a workbook, slide presentation, video lecture and examples. The participants were instructed to practice homework and apply skills during each module. They also had access to technical support with the goal of troubleshooting user issues such as resetting passwords or finding materials within the menus of the intervention. Support could be scheduled by participants for a maximum of 30-minutes, one time per week via phone call with a study therapist. No additional clinical or therapeutic advice was given.

Workshop Intervention Protocol

Participants in the workshop intervention were instructed to participate in two, 7-hour workshop days, one-month apart. The groups were facilitated by two clinicians (e.g., psychiatrist, occupational therapist, or social worker) and every participant received a workbook to accompany the day's agenda. Each day, four modules were covered within a didactic format with large and small group activities and discussions. Participants were instructed to practice homework and apply skills in-between the two workshops.

Measures

Primary Outcomes

Feasibility. Feasibility of the caregiver interventions were assessed in the following ways 1) acceptance of the intervention during recruitment and 2) attrition during the intervention. Qualitative feedback about the participant's experiences in each intervention were also

collected. Attrition was tracked after randomization (acceptance of the intervention type) and during the intervention (acceptance of the applied intervention).

For future studies, a no-go threshold for attrition was set at 30% attrition in either arm of the study between baseline and end of intervention.

Secondary Outcomes

The secondary feasibility outcomes of this study included a number of clinical measures administrated to caregivers at baseline, end of intervention, and three months post-intervention.

Caregiver Outcomes. Value of the intervention for caregivers was assessed using outcomes comprised of quality of life, caregiver accommodation, caregiver burden, expressed emotion in the family context, perceived stress, and perceived problem-solving abilities.

World Health Organization Quality of Life assessment (WHOQOL-BREF). The short version of the WHOQOL consists of 26 items. Using a five-point likert scale, the WHOQOL assesses four broad areas including: physical health, psychological, social relationships and environment. This instrument has sound psychometric data (WHOQOL GROUP, 1998).

Accommodation and Enabling Scale for Eating Disorders (AESED). The AESED is a 33-item measure designed to assess accommodating and enabling behaviours of caregivers (Sepulveda, Kyriacou & Treasure, 2009). Items are scored on a 5-point likert scale from “never” to “every day” and comprise five subscales including avoidance, modifying routines, reassurance seeking, meal rituals, control of family and turning a blind eye. Each scale has a Cronbach’s alpha value between .77 and .90.

Eating Disorder Symptom Impact Scale (EDSIS). The EDSIS assesses the impact of caring for people with eating disorders by examining negative appraisals of caregiving within the past month. Preliminary data has shown good psychometric properties (Sepulveda et al., 2008). The scale contains 24 items that are rated on a 5-point scale from "never" to "nearly always". The scale can be divided into four subscales: guilt, social isolation, dysregulated, and nutrition. The scales have a Cronbach's alpha from .84-.90 and convergent validity was moderately supported with scales measuring general caregiving (Sepulveda, Whitney, Hankins & Treasure, 2008).

Family Questionnaire (FQ). The FQ is designed to evaluate expressed emotions in family members of people with mental illness, has been shown to have good construct validity and internal consistency, and has previously been used in AN (Kyriacou et al., 2008).

Perceived Stress Scale (PSS). The PSS consists of 10 items on a 5-point likert scale ranging from "never" to "very often" (Cohen et al., 1983). The scale aims to measure an individual's subjective perception of stress in their current life across two subscales "perceived helplessness" and "perceived self-efficacy". The scale has been shown to have adequate reliability (.85 and .82 for "perceived helplessness" and "perceived self-efficacy" respectively) (Roberti, Harrington & Storch, 2006).

Short Social Problem-Solving Inventory-Revised (S-SPSI-R). The S-SPSI-R assesses an individual's ability to resolve everyday problems (D'Zurilla, Nezu, & Maydeu-Olivares, 1996). The short-form contains 25 items on a 4-point likert scale and provides scores on 5 subscales: positive problem orientation, negative problem orientation, rational problem solving, impulsivity/carelessness style, avoidance style. All subscales had adequate internal consistency (alpha range = .79 – .96) and test-retest reliability (alpha range = .72 – .88). The scale has also

been found to have adequate convergent and discriminant validity with scales for self-efficacy and optimism (Chang & D'Zurilla, 1996).

Participants

The baseline demographic and clinical characteristics for the total sample (*n* = 50), as well as each of the subgroups (i.e., participants in the caregiver workshop, participants in the web-based intervention) are presented in Table 1. The majority of the caregivers were parents (94%), followed by partners (4%) and friends (2%). While all of the eating disorder diagnoses are reported by the caregivers, 48 participants (96%) asserted that their loved one received a diagnosis from a psychologist, psychiatrist, or family doctor. Nine participants (18%) reported comorbid eating disorder diagnoses for their loved one. ~~The majority of the caregivers were parents (94%), followed by partners (4%) and friends (2%). While all of the eating disorder diagnoses are self-reported, 48 participants (96%) asserted that they received a diagnosis from a psychologist, psychiatrist, or family doctor. Nine participants (18%) reported comorbid eating disorder diagnoses.~~

[Insert Table 1 about here]

Missing Data

Multiple imputation (Rubin, 1987) was conducted in order to address missing data. Accordingly, missing values were replaced by imputed values through the statistical software package creating multiple iterations of the dataset. These imputed values were "sampled from a predictive distribution based on the observed data" (Sterne et al., 2009, p. 37). Every participant who began the intervention was analyzed at all three time points, regardless of their study completion or withdrawal. As described above, ~~total~~ withdrawal rates during the

intervention across both ~~interventions~~ conditions ~~was~~ were (*n* =10 ~~10~~9, 20~~22~~.5%); workshop (*n* = ~~6~~56; ~~22.2~~22.2~~12~~.5%), web (*n* = 4; ~~17.39~~17.4~~10~~.0%). Studies have supported using multiple imputation with small samples (Barnes et al., 2006; Hardt et al., 2012; Cheema, 2014). For example, studies with samples of 50 or more with 10% missing data at random utilizing multiple imputation demonstrate acceptable type I error rates (McNeish, 2016).

Data Analytic Plan

Qualitative interviews were used to contextualize quantitative data and provide insight into the feasibility of the intervention with caregivers. This process triangulates findings by ensuring the results presented by researchers are in-line with the participant's experiences (Ruark & Fielding-Miller, 2016). Summative content analysis was chosen for the analysis as it allowed a presentation of content related to participants' perception of the interventions (Hsiu-Fang, Hsieh & Shannon, 2005). The procedures for summative content analysis as described in Hsiu-Fang, Hsieh & Shannon (2005) were used: pre-defined codes were created (positive, negative, neutral) in order to count the frequency of participants and further meaning was derived based on these results. All interviews were read and re-read for understanding of the content present and coded for "positive", "negative" or "neutral" experiences within the caregiver psychoeducation. Analysis was reviewed with the senior author to achieve consensus in coding the content within each interview.

Quantitative analyses were performed in IBM SPSS Statistics Version 24. A series of independent samples t-tests were conducted for changes in the total scores of the AESED, EDSIS, FQ, PSS, and S-SPSI-R; and the mean scores for each domain of the WHOQOL-BREF from baseline to the end of intervention and from baseline to three months post-intervention in

order to assess the feasibility of the web and workshop interventions. One participant was excluded from the independent samples t-tests for the PSS because they did not complete this questionnaire at baseline. Effect sizes for each caregiver outcome were calculated, whereby we report the between-group effect size as Cohen's *d*. Values of 0.20, 0.50, and 0.80 comprised small, medium, and large effect sizes, respectively.

Results

Intervention Feasibility

[insert Figure 1 Here]

Acceptance of the intervention during recruitment. Fifty-four family member caregivers (i.e., parents, partners, ~~siblings~~friends) of adults 17 years of age and older (range of 23.89 – 66.53 years) were recruited for this feasibility study. ~~The final sample consisted of thirty caregivers.~~ During recruitment, the research coordinator made direct contact with 83 potential participants who were assessed for eligibility. Of these 83 potential participants, 66 (79.52%) were eligible to participate; 14 of 66 potential participants (21.21%) were unwilling to be randomized and 3 (4.5%) were not a caregiver to someone with an eating disorder. Of those who were eligible to participate and willing to be randomized (*n* = 66), 54 (81.81%) completed T1 Questionnaires. Twenty-Seven were randomized to the workshop and 27 to the web-intervention. Four individuals who were randomized to the web-intervention withdrew from the study immediately after randomization (14.81%). From the total of 83 interested participants, 14 individuals (16.87% of potential participants) were not willing to be randomized due to unwillingness to participate in the web intervention, and all participants who withdrew immediately after randomization (*n* = 4, 4.8%) were from the web-intervention. No participants

declined to be randomized related to the possibility of being assigned to the workshop intervention. Although the study was open to caregivers across the province, all of those who expressed interest in the study lived in the Greater Toronto Area and would not have had long distances to travel to attend the workshop.

Feasibility of each intervention was also assessed by participant attrition. Withdrawals were defined as failure to complete the full web or workshop intervention. Total withdrawal rates across both interventions ~~was~~ were (*n* = ~~10~~9, 22.5%), and ~~was~~ were similar across both groups; workshop (*n* = ~~6~~5; ~~22~~12.2%), web (n = 4; ~~17.39~~10.0%). Reasons for withdrawal for the workshop participants were logistical or illness related (e.g., a participant was called into work or developed the flu and could not attend). Unfortunately, no reasons were given for withdrawal by web-participants as they failed to respond to attempts at contact from the research team. Neither withdrawal rate met the no-go criteria of 30% which was previously set by the research team as an indicator the intervention or research methodology was not sufficiently tolerable by study participants.

Summary of qualitative feedback. All participants from both the web (*n* = 6) and workshop (*n* = 6) interventions expressed that they learned useful skills to help their loved-one with an eating disorder. One participant (from the web condition) did not find the intervention helpful as they had previously engaged with many self-directed caregiver psychoeducation materials. Beyond the psychoeducation provided, participants in both conditions had positive, negative and neutral feedback about their experience. All six participants in the workshop intervention appreciated the benefits associated with gaining a peer-group of caregivers which persisted beyond the intervention while those in the web-intervention (*n* = 4) enjoyed the

privacy of learning the skills on their own via web-tools (e.g., laptop, computer, tablet device). Workshop participants provided feedback that they would have enjoyed ongoing workshop support beyond the two sessions (*n* = 5) and more time within the group to practice the skills they were learning (*n* = 3). The web-participants echoed this critique, noting that the inability to practice the skills they were being taught was a drawback of online learning (*n* = 6). A minority also wished for longer period of access to online psychoeducation materials to facilitate continued learning (*n* = 2). Negative comments focused on limitations of workshop or web psychoeducation such as being unable to focus on each individual participant's needs during the workshop (*n* = 3), lack of individualized materials online (*n* = 2), and the isolation of learning online (*n* = 6) when caregiving for someone with an eating disorder already increases caregiver isolation.

Intervention Effect Sizes

Table 2 presents the means, standard deviations, and between-group intervention effect sizes (with confidence intervals) for change scores of the secondary clinical outcome variables between baseline and post-intervention and between baseline and three months follow-up. From baseline to the end of intervention, the group difference in the change score was of small effect size for domain 1, domain 2, domain 3, and domain 4 of the WHOQOL-BREF; and the total scores of the AESED, EDSIS, FQ, PSS, and S-SPRI-R. The web-based intervention was favourable compared to the workshop intervention for domain 2 and domain 3 of the WHOQOL-BREF and the total scores for the AESED and the S-SPSI-R. The workshop intervention was favourable compared to the web-based intervention for domain 4 of the WHOQOL-BREF and the total scores for the EDSIS, FQ, and PSS.

From baseline to three months follow-up, the group difference in the change score was of small effect size for domain 1, domain 2,domain 3, and domain 4 of the WHOQOL-BREF and the total scores of the AESED, EDSIS, FQ, PSS, and S-SPSI-R. The web-based intervention was favourable compared to the workshop intervention for domains 1, 2, and 3 of the WHOQOL-BREF and the total scores for the EDSIS and the S-SPSI-R. The workshop intervention was favourable compared to the web-based intervention for domain 4 of the WHOQOL-BREF and the total scores for the AESED, FQ, and PSS.

[Insert Table 2 about here]

Discussion

Summary of Findings

The first objective of the feasibility study was to investigate the feasibility of two caregiver psychoeducation interventions. The web-intervention was less acceptable to participants than the workshop intervention. Some participants were unwilling to undergo randomization due to the possibility of obtaining the web-condition while others withdrew after being randomized to the web-condition. This was a surprising finding to the authors as making effective psychoeducation interventions available to more remote areas of Canada was a potential reason to conduct this research. However, despite intentions it may be that caregivers were interested in both skill development and a desire for emotional connection with other participants who could share their unique experiences of caregiving to someone with an ED. Caregivers to someone with an ED often feel isolated (Martin et al., 2015) and avoid social gatherings or events with others who lack an understanding of the illness and exacerbate their shame and guilt associated with the illness (Sepulveda et al., 2008d). Therefore,

participants may have had an initial preference for the workshop-based intervention given the access to other caregivers who could relate to their experiences and from whom they could learn effective strategies for illness management. From the participants' qualitative feedback, individuals from both conditions expressed a desire to connect with other participants for emotional support. For a future full-scale trial of these interventions and their impacts, a more explicit explanation to participants that the interventions focus on psychoeducation and not support may help to mitigate the differences in withdrawal. Also, as the study authors were localized in a metropolitan area, recruitment efforts for a future trial may benefit from partnerships with hospitals, organizations, and practitioners from rural locations.

While there were initial preferences for the workshop intervention, there were no differences in withdrawal between the two interventions and rates of drop out were similar to those found in other studies of workshop-based (Pepin et al., 2013; Rhodes et al., 2008, Sepulveda et al., 2008a; 2008b; Whitney et al., 2012) or web-based (Binford Hopf et al., 2013; Hibbs et al., 2015; Hoyle et al., 2013) interventions. Further, participants in both conditions reported finding the interventions helpful while enjoying aspects inherent to each condition's unique format. For web participants, the freedom to engage with the material in one's natural environment and at a pace unique to their context was considered a benefit. Workshop participants appreciated the connection and support of other caregivers and the opportunity to share their stories of being a caregiver.

The second aim of the study was to investigate the efficacy of the web and workshop psychoeducation interventions over time. From baseline to the end of intervention, small between-group effect sizes were observed for the changes in caregiver accommodation,

problem-solving abilities, the quality of psychological health, and the quality of social relationships, favouring the web-based intervention; and changes in expressed emotion in the family context, caregiver burden, perceived stress, and the quality of the environment, favouring the workshop intervention.

From baseline to three months follow-up, small between-group effect sizes were observed for the changes in caregiver burden, problem-solving abilities, the quality of physical health, the quality of social relationships, and the quality of psychological health, favouring the web-based intervention; and changes in caregiver accommodation, expressed emotion in the family context, perceived stress, and the quality of the environment, favouring the workshop intervention.

The study investigated general health and wellbeing, accommodation to illness behaviours, perceived burden, expressed emotion, perceived stress and social problem solving. All outcomes, with the exception of problem solving and perception of psychological wellbeing, significantly improved from baseline to three-months post-intervention and burden and expressed emotion also significantly improved from baseline to end-of-intervention. Most notably, there were no significant differences in caregiver outcomes between the web and workshop-based interventions indicating that both were similarly effective for caregivers.

To our knowledge, no previous studies have compared two different modes of caregiver education interventions. Typically, interventions are delivered in one of the following ways: a web-based, workshop-based, self-guided printed or video materials. After undergoing the intervention, investigators will assess caregiver distress, burden, health and quality of life, expressed emotion, accommodation and enabling in caregivers of adults as well as self-efficacy

in caregivers of adolescents (Anastasiadou et al., 2014; Hibbs et al., 2013; Stillar et al., 2016; Treasure et al., 2016). In previous studies, much like the present study, caregivers show improvement across all the above variables through engagement with a skills-based psychoeducation intervention. The findings of the current feasibility study are also similar to previous studies which have found that caregiver expressed emotion outcomes continue to improve after EOT and into follow-up periods (Grover et al., 2011; Hibbs et al., 2014; Sepulveda, 2010).

In a study by Hoyle et al. (2013) that used the same psychoeducation intervention as the present study, it was reported that 95% of caregivers found the online intervention helpful while experiencing a significant reduction on the intrusiveness subscale of the family questionnaire. This reflects a decrease in negative emotion directed at their loved one with an eating disorder. Further, the intervention decreased the negative impact of the eating disorder on the caregiver. The present study replicates previous findings that a web-based psychoeducation intervention can have beneficial outcomes for caregivers and extends the literature; however, when compared to a workshop-based intervention there were no significant differences. It is noteworthy that in the Hoyle et al. (2013) study, the authors reported difficulty in recruitment (total sample size of $N = 27$) and hypothesized that potential participants may have been disinterested in the study due to the web-based nature of the education. This is a similar finding to the present study where a small percentage of participants similarly withdrew their participation after randomization to the web-intervention, but before beginning the intervention expressing their concerns or discontent with the outcome of the randomization.

Implications for Future Research

In the current feasibility study, both caregiver interventions were acceptable and feasible to study participants which can be built upon in future research. Further, both caregiver psychoeducation interventions were effective in improving outcomes for caregivers and worthy of a larger scale RCT. It is a noteworthy finding within a skills-based psychoeducation intervention that caregivers improved on measures of health, accommodation and enabling, burden, expressed emotion and perceived stress but not on a measure of social problem solving. Measures of accommodation to the illness and the impact of the eating disorder demonstrated improvements over the course of the interventions; these measures assess variables that are within the control and perception of the caregiver. It may be that caregivers question the effectiveness of their problem solving if their loved-one's illness remains unchanged over the course of the intervention. It is also possible that caregivers required a longer time period to practice problem solving skills. It is recommended that future studies of caregiver psychoeducation strive to increase the sample size of caregivers. Effort should also be made to include sample characteristics of the loved one with an eating disorder. Collection of eating disorder characteristics may enable investigators to more carefully assess social problem solving and how the eating disorder may impact the other variables typically assessed.

In future studies, attention should be paid to implementation of recruitment across broad geographic areas; one unique benefit of a web-intervention is its near limitless implementation due to no requirements for staffing, travel, etc. An RCT comparing a web vs. workshop intervention may limit participant inclusion as those living in remote areas may be

unwilling to be randomised to the workshop arm. Ultimately, clinicians should elevate the specific needs of families and caregivers when offering services. For example, the benefits of a web intervention may be most pronounced when offered to those in rural areas where access to specialized eating disorder support is limited and geographic disparity may prevent access to care.

Strengths and Limitations

The current feasibility study used a stratified randomization protocol to ensure that the ratio of participants whose loved-one had AN or BN were equal across web and workshop interventions. Further, the study elicited qualitative feedback from participants to better contextualize the quantitative findings and add a deeper understanding of participant experiences of intervention methods to the literature. However, there are limitations that should be considered when interpreting results and for a future study of caregiver psychoeducation interventions in a randomized controlled trial. Individuals who were randomized to the web but selected to withdraw from the intervention did not provide reasons for withdrawal and therefore the study can only speculate on their reasons. It is impossible to know if participant's withdrew for similar reasons to workshop participants (e.g., illness) or if they stopped participation due to dissatisfaction. We urge future to make explicit the importance of participant feedback upon ending to try to circumvent this limitation. Further, due to the randomized nature of the study, interested potential participants may not have inquired about the study due to their geographic location outside of the workshop offering. Future comparative studies may benefit from multiple intervention sites to better obtain a broad and representative sample. Finally, given that there were small effect sizes for all of the

intervention mean change scores of the clinical outcome measures, a larger sample size would have increased the chances of detecting differences between the web-based and workshop intervention protocols in a more reliable manner. We did experience attrition throughout the study, most markedly at the time of questionnaires (Figure 1). However, rates of recruitment and attrition were similar to previous studies of caregiver education for eating disorders in the Canadian context (Spettigue et al., 2015). The present study offered questionnaires online to try and mitigate drop-out but we would recommend to future studies that multiple modes of data collection be use in order to facilitate stronger retention.

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Conclusions

The current feasibility study presents an examination of web and workshop psychoeducation interventions for caregivers to adults with an eating disorder. Both interventions were acceptable to caregivers and both interventions performed similarly in terms of impacts on caregivers. This feasibility study recommends that a full scale trial of web versus workshop intervention for caregivers is conducted.

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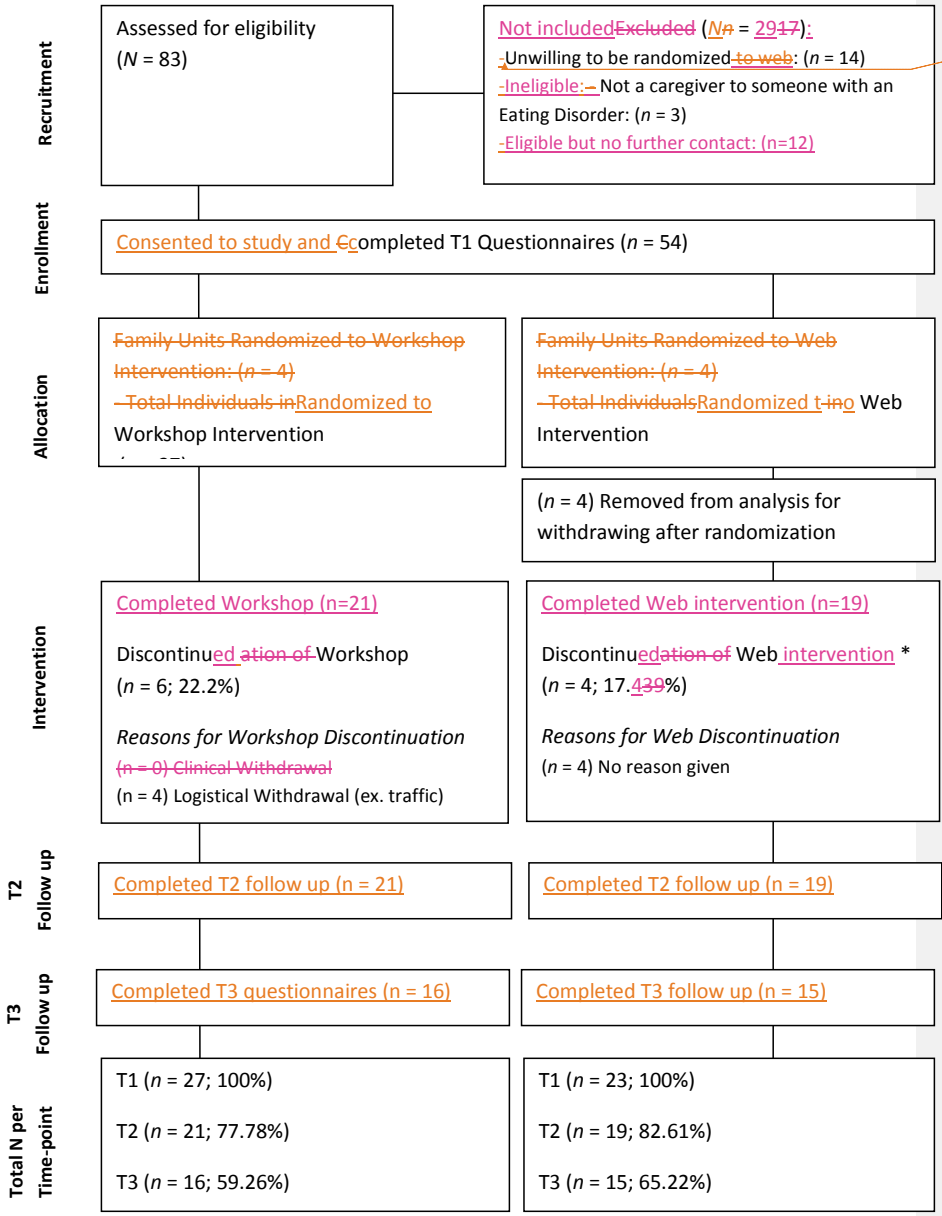
Figure 1. Consort Diagram



*due to the nature of the web-intervention, participants who withdrew did not respond to attempts to elicit a response RE: when and why they withdrew during the intervention.

Commented [SU1]: In the margin where it says T2 Follow-up – this is not in the right place, because the box with treatment completion comes before T2 – which is the post-treatment assessment which should be in a separate box.

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Table 1

Demographic and Clinical Characteristics at Baseline (n = 50)

	Total Sample			Web-
	n	Percent or Mean	*SD*	*n*
Caregiver age (range 23.89 - 66.53 years)		51.05	9.67	
Caregiver gender				
Female	35	70.00		19
Male	15	30.00		4
Caregiver marital Status				
Single	13	26.00		8
Partnered/married	37	74.00		15
Caregiver education				
High school	3	6.00		2
College or university	47	94.00		21
Patient diagnosis				
Anorexia Nervosa - Binge/Purge Subtype	10	20.00		4
Anorexia Nervosa - Restricting Subtype	18	36.00		10
Anorexia Nervosa - Unknown Subtype	27	54.00		3
Bulimia Nervosa	16	32.00		8
Binge Eating Disorder	6	12.00		3
Avoidant/Restrictive Food Intake Disorder	4	8.00		1
Type of caregiver				
Parent	47	94.00		23
Partner	2	4.00		0
Friend	1	2.00		0

·Based Intervention (*n* = 23)			Workshop Intervention (*n* = 27)	
Percent or Mean	*SD*	*n*	Percent or Mean	*SD*
53.40	6.68		48.89	11.49
82.61		16	59.26	
17.39		11	40.74	
34.78		5	18.52	
65.22		22	81.48	
8.70		1	3.70	
91.30		26	96.30	
17.39		6	22.22	
43.48		8	29.63	
13.04		6	22.22	
34.78		8	29.63	
13.04		3	11.11	
4.35		3	11.11	
100.00		24	88.89	
0.00		2	7.41	
0.00		1	3.70	

Table 2

Mean Change Scores for the Secondary Clinical Outcome Measures

	End of Treatment (Adjusted for Baseline)					
	Web-Based Intervention Mean Change Score			Workshop Intervention Mean Change Score		
	n	Intervention Mean Change Score	SD	*n*	Intervention Mean Change Score	SD
WHOQOL-BREF Domain 1 Mean Score	23	0.11	0.81	27	0.11 (1.34)	1.34
WHOQOL-BREF Domain 2 Mean Score	23	0.39	1.31	27	0.32 (1.41)	1.41
WHOQOL-BREF Domain 3 Mean Score	23	0.48	1.42	27	0.12 (1.62)	1.62
WHOQOL-BREF Domain 4 Mean Score	23	-0.07	1.03	27	0.13 (1.47)	1.47
AESED Total Score	23	-6.97	16.75	27	-6.64 (15.01)	15.01
EDSIS Total Score	23	-4.71	12.48	27	-7.50 (13.94)	13.94
FQ Total Score	23	-2.50	5.51	27	-3.41 (7.26)	7.26
PSS Total Score	22	-0.23	4.56	27	-1.18 (4.62)	4.62
S-SPSI-R Total Score	23	0.07	1.19	27	-0.26 (1.31)	1.31

Note: WHOQOL-BREF = abbreviated World Health Organization Quality of Life assessment; AESED = Accommodation and Enabling Scale for Eating Disorders; EDSIS = Eating Disorder Symptom Impact Scale; FQ = Family Questionnaire; PSS = Perceived Stress Scale; S-SPSI-R = Social Problem Solving Inventory - Revised

		3 Months Follow-Up (Adjusted for Baseline)					
		Web-Based Intervention Mean Change Score			Workshop Intervention Mean Change Score		
d	95% CI	*n*	Intervention Mean Change Score	SD	*n*	Intervention Mean Change Score	SD	*d*
0	(-0.60 to 0.60)	23	0.19	0.76	27	0.06	1.25	0.13
0.05	(-0.70 to 0.84)	23	0.74	1.78	27	0.24	1.37	0.31
0.24	(-0.24 to 1.13)	23	0.15	1.60	27	0.01	2.46	0.07
0.16	(-0.91 to 0.51)	23	-0.12	1.43	27	0.28	1.52	0.27
0.02	(-8.98 to 8.33)	23	-9.03	21.07	27	-9.77	19.51	0.05
0.21	(-4.76 to 10.34)	23	-9.40	13.74	27	-9.16	20.41	0.01
0.14	(-2.70 to 4.51)	23	-3.03	8.18	27	-4.54	9.30	0.17
0.21	(-2.18 to 4.07)	22	-1.90	4.35	27	-2.65	5.09	0.16
0.26	(-0.32 to 0.96)	23	0.21	1.95	27	-0.11	1.62	0.18

95% CI
(-0.47 to 0.72)
(-0.39 to 1.38)
(-1.04 to 1.32)
(-1.17 to 0.36)
(-10.95 to 12.44)
(-9.87 to 9.40)
(-3.57 to 6.58)
(-2.29 to 3.80)
(-0.65 to 1.30)

29

0.144 0.020736 0.000715